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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,132	12/17/2001	Ali Rusta-Sallehy	9351-87 HSF	4158
1059	7590	11/17/2004		
BERESKIN AND PARR SCOTIA PLAZA 40 KING STREET WEST-SUITE 4000 BOX 401 TORONTO, ON M5H 3Y2 CANADA			EXAMINER RIDLEY, BASIA ANNA	
			ART UNIT 1764	PAPER NUMBER

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/016,132

Applicant(s)

RUSTA-SALLEHY ET AL

Examiner

Basia Ridley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2004 and 13 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7,8,11-13,28,30,32 and 33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7,8,11-13,28,30,32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Regarding amendments filed on 7 July 2004 and 13 August 2004, the examiner notes that claim 8 was amended by the applicant to correct its dependency, as shown by the claim listing filed on 13 August 2004, even though fifth full paragraph on page 11 of amendment filed on 7 July 2004 states that said claim 8 was cancelled and its subject matter was introduced into claim 1.

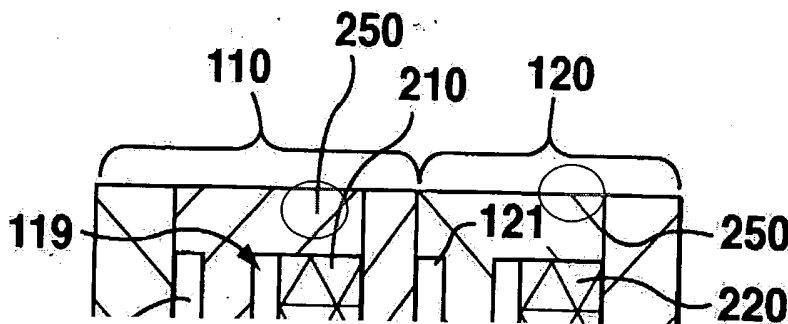
Specification

2. The disclosure is objected to because of the following informalities:
- P13/L2, "a solution supply means" should be replaced with --coolant supply means--.

Appropriate correction is required.

Drawings

3. The Replacement Figures 6 and 8 were received on 13 August 2004. These drawings are acceptable.
4. The drawings filed on 11 March 2002 are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "250" in Fig. 1a has been used to designate, both, a rim and an external wall of reactor stack. See below reproduced cutout of Fig. 1a with added markings to clarify the objection:



Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the

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Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, 3-5, 7 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569) in view of Ashmed et al. (USP 5,690,763) and further in view of Usher (USP 4,063,591) or Napper (USP 6,309,519).

Regarding claims 1, 3-5, 7 and 11-13 Lippert et al. discloses a reactor vessel comprising:

- a plurality of reaction chambers (each comprising of channels 3 of a plate) and a plurality of coolant chamber (each comprising of channels 6 of a plate) alternating with one another, each reaction chamber being configured to receive reactant and to bring at least a portion of said reactant in contact with catalyst (4), each coolant chamber being configured to receive a coolant flow (P3/L7-P5/L21); and
- a plurality of reactor plates (2a-c), each having a first face and a second face in opposing relation with the first face, wherein the first face defines a solution flow field and a portion of one reaction chamber and the second face defines a coolant flow field and a portion of one coolant chamber (Fig. 3);

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- wherein a plurality of separator plates (9) alternate with the reaction plates (2a-c), to define the plurality of reaction chambers alternating with a plurality of coolant chambers, each reaction chamber being in fluid communication with an adjacent one of the plurality of reaction chambers and each coolant chamber being in fluid communication with an adjacent coolant chamber (Fig. 3 and P3/L7-P5/L21);
- wherein each separator plate includes openings providing inlets and outlets to the coolant and reactant aligned with the reactant and coolant inlets and outlets of the reactor plates, whereby distribution ducts are formed extending through the reactor plates and separator plates to distribute both the reactant and the coolant to the reaction and coolant chambers and to collect the reactant and coolant from the reaction and coolant chambers (P3/L7-P5/L21);
- the reactant flow field comprises a plurality of reactant channels (3) and the coolant flow field comprises a plurality of coolant channels (6);
- comprising a catalyst (4) located on at least a portion of the plurality of reactant channels (3);
- wherein the catalyst is in pellet form (P4/L10-13);
- wherein the plurality of the reactant channels extend from the reactant inlet to reactant outlet and the plurality of the coolant channels extend from the coolant inlet to coolant outlet (P3/L7-P5/L21);

Additionally the reference discloses the reactor vessel that appears to be the same as, or an obvious variant of the reactor vessel comprising rectangular reactor plates and including a reactant inlet and outlet located opposite to one another and in communication with the reactant flow field and a coolant inlet and outlet located opposite to one another and in communication with the coolant flow field, wherein the reactant inlet and outlet and the coolant inlet and outlet all extend through the plate for forming distribution ducts from a plurality of similar reactor plates stacked

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together and wherein the reactant channels and the coolant channels are substantially parallel, set forth in the instant claims (see Fig. 3, P3/L7-P5/L21 and P6/L11-P7/L8).

Further the reference discloses the reactor vessel wherein the reactor plates and the separator plates are positioned in substantially parallel spaced relationship, thereby forming a stack of the plurality of reactor vessels, and wherein means are provided for joining the reactor plates and the separator plates together, such as welding or soldering (Fig. 3 and P1/L1-16), but the reference does not explicitly disclose said means for joining comprising means for clamping.

Ashmed et al. establishes equivalency of clamping, welding and soldering as joining means for a reactor vessel comprising reactor plates (Fig. 1 and C2/L22-33). As instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute means for clamping as the means for joining in the reactor vessel Lippert et al., since such modification would have involved a mere substitution of known equivalent structures. A substitution of known equivalent structures is generally recognized as being within the level of ordinary skill in the art.

While Lippert et al. in view of Ashmed et al. does not explicitly disclose said reactor plates further comprising gasket grooves on the first and second faces thereof, and a gasket is provided between each pair of adjacent reactor and separator plates, to form seals for the reaction and coolant chambers, use of gaskets in gasket grooves, wherein said grooves are formed in the plates having flow channels, in apparatus comprising clamped plates is conventional for defining boundaries of the flow spaces and to seal the flow spaces of one medium from the ports of the other medium, as shown by Usher (Fig. 3 and 5 and C1/L4-26) or Napper (Fig. 4). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use conventional gasket grooves on the first and second faces of reactor plates of Lippert et al. in view of Ashmed et al. for

the purpose of defining boundaries of the flow spaces and to seal the flow spaces of one medium from the ports of the other medium.

Regarding limitations recited in claims 1, 3-5, 7 and 11-13 which are directed to a manner of operating disclosed reactor vessel, such as specific type of reactant, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, the examiner notes that process limitations, such as “configured to receive a hydride solution” do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

7. Claims 8, 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569) in view of Ashmed et al. (USP 5,690,763) and further in view of Usher (USP 4,063,591) or Napper (USP 6,309,519), as applied to claim 7 above, and further in view of Pellegrini et al. (USP 4,217,401) or Godec et al. (USP 6,183,695).

Regarding claims 8, 28 and 30, Lippert et al. in view of Ashmed et al. and further in view of Usher or Napper discloses all of the claim limitations as set forth above. Additionally, while the references do not explicitly disclose the reactant inlet and reactant outlet being located proximate to diagonal corners of the reactor plate, the coolant inlet and coolant outlet being located proximate to remaining diagonal corners of said reactor plate, or the reactant flow field and the coolant flow field comprising a plurality of tortuous channels extending between the respective inlets and outlets, the references are not limited to any specific arrangement of said inlets and outlets (see Lippert et al., P3/L7-P5/L21). As rectangular reactor plates wherein the inlets and outlets extend through the plate

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for forming distribution ducts, said inlets and outlets being located proximate to diagonal corners of the reactor plate and wherein the flow field comprise a plurality of tortuous channels were well known in the art at the time the invention was made, as evidenced by Pellegrini et al. (Fig. 1) and/or Godec et al. (Fig. 1), and further, as the instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use any arrangement of said coolant inlets and outlets, said reactant inlets and outlets, and said channels including inlets and outlets being located proximate to diagonal corners of the reactor plate and tortuous channels, in the reactor vessel of Lippert et al. Said combination would amount to use of a known element for its intended use in a known environment to accomplish entirely expected result.

Regarding limitations recited in claims 8, 28 and 30 which are directed to a manner of operating disclosed reactor vessel, such as specific type of reactant, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, the examiner notes that process limitations, such as "configured to receive a hydride solution" do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

8. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569) in view of Ashmed et al. (USP 5,690,763) and further in view of Usher (USP 4,063,591) or Napper (USP 6,309,519), as applied to claim 1 above, and further in view in view of Jung et al. (USP 3,511,710) or Amendola et al. (USP 6,534,033).

Regarding claim 32, Lippert et al. in view of Ashmed et al. and further in view of Usher or Napper disclose all the claim limitations as set forth above. Additionally, Lippert et al. discloses the reactor vessel comprising:

- a reactant supply means for supplying reactant flow (P3/L7-P5/L21);
- a coolant supply means for supplying a coolant flow (P3/L7-P5/L21).

While Lippert et al. discloses that said reactor vessel can be used for various chemical reactions requiring heat transfer to or from the reaction chamber, especially for production of hydrogen to be used in fuel cells (P4/L14-33), the reference does not explicitly disclose said reactant supply means comprising means for supplying a hydride solution.

Both, Jung et al. (C1/L64-70, C2/L68-C3/L10) and Amendola et al. (abstract and C4/L62-C5/L4) teach that it is known to produce hydrogen by contacting a hydride solution with catalyst while controlling the temperature at which reaction occurs.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use the reactor vessel of Lippert et al. in view of Ashmed et al. and further in view of Usher or Napper for the purpose of producing hydrogen for fuel cell by reaction of hydride solution in presence of catalyst, as taught by Jung et al. or Amendola et al., by using the supply means for supplying a hydride solution, as doing so would amount to nothing more than use of a known reactor for its intended use in a known environment to accomplish entirely expected result.

Regarding limitations recited in claim 32 which are directed to a manner of operating disclosed reactor vessel, such as specific type of reactant, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, the examiner notes that process limitations, such as “configured to receive

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a hydride solution” do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

9. Claim(s) 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippert et al. (WO 99/64146, English equivalent: US 6,470,569) in view of Ashmed et al. (USP 5,690,763), in view of Usher (USP 4,063,591) or Napper (USP 6,309,519), and further in view of Jung et al. (USP 3,511,710) or Amendola et al. (USP 6,534,033), as applied to claim 32 above, and further in view of Anderson (USP 3,594,557).

Regarding claim 33, Lippert et al. in view of Ashmed et al., in view of Usher or Napper, and further in view of Jung et al. or Amendola et al. disclose all of the claim limitations as set forth above. Additionally the references disclose that it is necessary to control the temperature of the hydride solution (see Jung et al. (C1/L64-70, C2/L68-C3/L10) and Amendola et al. (abstract and C4/L62-C5/L4)).

Lippert et al. in view of Ashmed et al., in view of Usher or Napper, and further in view of Jung et al. or Amendola et al. do not explicitly disclose said control being accomplished by controlling at least one of the temperature and the flow rate of the coolant flow through the coolant chamber. As it is known to control a temperature of chemical reaction apparatus by control at least one of the temperature and the flow rate of the coolant flow (Anderson, C1/L8-28), and further, as the instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use any means for controlling the temperature of the reaction chamber of Lippert et al., including by control at least one of the temperature and the flow rate of the coolant flow through the coolant chamber. Said control would

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amount to use of a known control element for its intended use in a known environment to accomplish entirely expected result.

Regarding limitations recited in claim 33 which are directed to a manner of operating disclosed reactor vessel, such as specific type of reactant, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, the examiner notes that process limitations, such as “configured to receive a hydride solution” do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Response to Arguments

11. Applicant's arguments filed on 7 July 2004 and 13 August 2004 have been fully considered but they are not persuasive.

12. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., separator plates

comprising simply plain plates or issue of aligning or issue of aligning gaskets in compact configuration) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

13. In response to applicant's arguments against the Lippert et al. individually, examiner notes that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

14. Applicant argues that Lippert et al. is entirely silent on the issue of providing communication to the various chambers or formation of distribution ducts and manifolds. This is not found persuasive, as Lippert et al. clearly teaches that supply of the reaction media may take place in any desired form inside of outside the stack of plates, preferably through supply and discharge channels, which extend in the stacking direction and are formed by corresponding bores in the plates (see Lippert et al., C2/L19-27).

15. In response to applicant's argument that Ashmed et al., is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, applicant states that Ahmed et al. is concerned with "an integrated chemical processing apparatus" and that Lippert et al. is concerned with "a catalytic reactor". Since both these references disclose catalytic plate reactors with integral heat exchange they are both, clearly, in the field of applicant's endeavor.

16. In response to applicant's argument that Godec et al. and Pellegrini et al. are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). Since, both references, like the instant invention and Lippert et al., are drawn to use of plate reactors, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the reactor of Lippert et al. according to teachings of Godec et al. and Pellegrini et al., as one of ordinary skill in the art at the time the invention was made would recognize that a plate reactor can be used for various reactions, and therefore, when looking for modification of said plate reactor, one of ordinary skill in the art would utilize teachings regarding said plate reactor which can be found in various applications, and not just in one specific application, such as production of hydrogen from hydride solution.

17. In response to applicant's argument that there an ordinary artisan would not combine the teachings of Lippert with either Jung et al. or Amendola et al., because reactor of Lippert et al. would not operate properly when used to produce hydrogen from hydride solution, the examiner notes that the applicant has not presented any compelling evidence to suggest that this is in fact the case. In this regard, mere arguments and conclusory statements, which are unsupported by factual evidence, are entitled to little probative value.

18. In response to applicant's argument that Anderson is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In the instant case, Anderson is directed to method and apparatus

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for control of variables in a chemical process (see Anderson, C1/L5-28), therefore said reference is reasonably pertinent to the particular problem with which the applicant was concerned, specifically to controlling the temperature in the chemical process, such as hydrogen production.

19. Applicant's arguments with respect to recitation of gasket grooves and gaskets have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

20. In Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

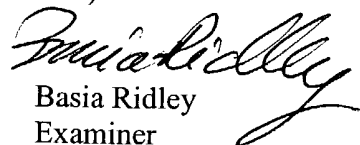
Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair->

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direct.uspto.gov. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Basia Ridley', is positioned above the printed name.

Basia Ridley
Examiner
Art Unit 1764

BR

November 15, 2004